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AUTHOR Blood, Deborah J.; Snyder, Leslie B.
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ABSTRACT

A study investigated the effects of the newly introduced Surgeon General's alcohol warnings and advertisements on college students. One hundred fifty-nine undergraduates in communication sciences at the University of Connecticut viewed slides of alcohol products, with or without advertisements and warnings. Following the viewings, subjects filled out questionnaires on product evaluation and on alcohol consumption and risk. Results indicated that the alcohol warnings boomeranged, causing drinkers to perceive greater benefits from the alcoholic beverages. Results also indicated that the advertisements had powerful effects on both drinkers and non-drinkers, increasing perceptions of benefits and decreasing perceptions of risks. Results suggest that, for young people, the warning labels in their present form may be counterproductive, and that advertisements make drinking more attractive. (Two tables of data are included; 46 references are attached.) (Author/PRA)

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Caution:

Alcohol Advertising and The Surgeon General's Alcohol Warnings May Have Adverse Effects on Young Adults

Deborah J. Blood

and

Leslie B. Snyder

Box U-85

Department of Communication Sciences

University of Connecticut

Storrs, CT 06269-1085

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Leslie B. Snyder (Ph.D. Stanford University, 1986) is an Assistant Professor of Communication Sciences at the University of Connecticut. Deborah J. Blood is a doctoral student in Marketing Communication at the University of Connecticut.

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Caution:

Alcohol Advertising and The Surgeon General's Alcohol Warnings May Have Adverse Effects on Young Adults

Abstract

Government mandated warnings are becoming more common. However, studies have not compared the effect of warnings, meant to increase perception of risk, to advertising, which aims to decrease perceptions of risk and enhance perceptions of product benefits. We conducted an experiment to test the effects of the newly introduced Surgeon General's alcohol warnings and advertisements on college students. Surprisingly, the warnings boomeranged, causing drinkers to perceive greater benefits from the alcoholic beverages. The advertisements had powerful effects on both drinkers and nondrinkers, increasing perceptions of benefits and decreasing risks. In part, the ads worked by causing people to perceive fewer risks communicated by the stimulus materials, and reducing people's ability to recall the content of the warning. The results suggest that, for young people, the warning labels in their present form may be counterproductive, and advertisements make drinking more attractive. Implications for warning and advertising policies are discussed.

Caution:

Alcohol Advertising and The Surgeon General's Alcohol Warnings

May Have Adverse Effects on Young Adults

Warning labels and warnings on advertisements are intended to inform consumers of the risks involved in using some dangerous products, such as cigarettes, prescription drugs, and alcohol. It is unclear, however, what happens when consumers see warnings in an environment of relatively unrestricted advertising. The message to consumers is ambiguous: the warning attempts to increase public perception of risk, while the advertisement aims to attenuate perceived risk. In this paper we examine whether warnings increase the perception of risk in the presence of advertisements for alcohol products. The problem is particularly germane for alcohol since the federal government has mandated warning labels for beer, wine, and liquor since November 1989, and has considered a ban on advertisements. Although the alcohol industry spends an estimated $2 billion a year on advertising and promotion (Lallande, 1989), little research has been directed towards the role of advertising media in influencing public perception of alcohol risk.

Alcohol Advertising and Warning Policy

Given that alcohol consumption is dangerous under certain conditions, the public policy debate has touched upon several different issues -- deceptive advertising, consumption promotion, product liability, and provision of information. The potential governmental reactions have been outright bans on alcohol advertising, mandatory counter-advertising, and

warning labels. Lobbyists against liquor advertisements contend that advertisements increase consumption, deceive by "glamorizing drinking as essential to creativity, success, athletic performance, and sexual prowess, but fail to inform the public of the dangers of alcohol abuse" (Young, 1987, p. 1141). Wine industry codes (Wine Institute Code of Advertising, 1978, in Young, 1987, p. 1147) prohibiting "any advertisement which has an appeal to persons below the legal drinking age" notwithstanding, the anti-liquor lobby claims that alcohol advertisements routinely target appeals to youths. The beer industry claims to draw the line at ads that induce "overindulgence" (Young, 1987, p. 1146). Similarly, ads will not be considered deceptive by the Federal Trade Commission unless there is direct proof of the links between alcohol ads and alcohol abuse, but there has been "no reliable basis on which to conclude that alcohol advertising significantly affects alcohol abuse" (Young, 1987, p. 1151).

The judicial position is that every advertised product is glamorized and can be abused, but that the abuse of alcohol is the result of a lack of public education (Young, 1987). Thus, advertising bans or restrictions have been set aside in favor of warnings on products. Current statutes already require manufacturers to display warning labels on cigarettes, smokeless tobacco, over-the-counter and prescription drugs, aspirin, and products containing saccharin. In addition, product liability law encourages manufacturers to voluntarily place warning labels on other potentially dangerous products. The warning label for beer, wine and liquor, which must be conspicuously and prominently placed on the container states:

> "Government Warning: (1) According To The Surgeon General, Women Should Not Drink Alcoholic Beverages During Pregnancy Because Of The Risk Of

Birth Defects. (2) Consumption Of Alcoholic Beverages Impairs Your Ability To Drive A Car Or Operate Machinery, And May Cause Health Problems."

Perception of Risk

To understand the potential effects of ads and warning labels, one must understand how people conceive of and react to risk. One approach to risk analyses has been to assume that people will weigh the probability of events and the magnitude of specific consequences (Kasperson, Renn, Slovic, Brown, Emel, Goble, Kasperson, J., & Ratick, 1988; Kates & Kasperson, 1983; Lowrance, 1976). People are assumed to be rational, seeking out facts and then reasoning through to a logical evaluation of the risk and appropriate responses. However, people's assessments of the probability of events may also depend on irrational judgments (Kasperson et al., 1988; Kates & Kasperson, 1983; Short, 1984).

Studies of cognition have demonstrated that people do not always reason like engineers or "naive scientists," relying instead on cognitive heuristics to make inferences about risk (Tversky & Kahneman, 1973; 1982). Misunderstandings of probability and statistics, biased media coverage, misleading personal experiences, and anxiety can cause risks to be over or underestimated. Furthermore, risk judgments may be influenced by the characteristics of the risk, such as potential for catastrophy, lack of control, dread and fatal consequences (Slovic, Fischhoff, & Lichtenstein, 1980; 1982; Slovic, 1987).

One heuristic that may be particularly relevant to assessing risk is "availability" -- events (including hazards) are judged as more frequent or likely if they are easy to imagine or recall (Tversky & Kahneman, 1973;

1982). Availability can be appropriate when frequently occurring events are indeed easy to imagine or remember. However, other factors, such as vivid news coverage of an event, can also affect availability, leading to large and persistent biases (Slovic et al., 1982). Working towards a goal opposite that of warnings, a vivid alcohol advertisement may help make safe drinking more memorable and seem more frequent.

Research comparing the media, interpersonal channels, and personal experience suggests that the media are better at influencing impersonal (or social) level estimates of risk to the community than personal risk (Culbertson and Stempel, 1985; Doob & MacDonald, 1979; Hughes, 1980; Skogan & Maxfield, 1981; Tyler, 1980, 1984; Tyler & Cook, 1984). The "impersonal impact hypothesis" may help account for many reported failures of public media campaigns directed at health-related personal behaviors such as smoking (Warner, 1977) and wearing seat belts (Robertson, 1976). Snyder and Rouse (1990) suggest that the impersonal impact may be confined to news and information-oriented messages; two studies of dramatic forms of messages (Snyder & Rouse, 1990; Sussman et al., 1989) did find changes in personal assessments. Thus, the warning labels, as an informational appeal, may change judgements of other people's risk, without affecting personal risk, while dramatic advertising may decrease personal risk estimates.

Another way in which advertisements may affect perceptions of risk is by making the product seem more attractive. The risk-benefit trade-off proposed by Starr (1969) suggests that increasing perceived benefits will increase risk acceptability. An advertisement that focuses on alcohol consumption benefits can be seen as employing an indirect risk attenuation strategy. The risk-benefit trade-off may go some way towards explaining the

persistance of adverse health practices such as smoking and alcohol abuse for some individuals, in spite of repeated warnings about risks.

When advertisements and warnings are presented together, advertising may have a noise-related (Lehto and Miller, 1988) or distraction effect upon the efficacy of warning labels. An irrelevant distraction reduces attitude change by inhibiting message comprehension (Buller, 1986). Roadside advertisements have been demonstrated to reduce the perception of traffic signs (Holahan, 1977; Boersema and Zwaga 1985). Advertisements depicting smokers as attractive, healthy individuals may effectively counter warning messages that smoking is dangerous to one's health (Altman, Slater, Albright, & Maccoby, 1987). In a study by Loken and Howard-Pitney (1988), the effects of an attractive model in the ad were substantially greater than the countering influences of specific cigarette warnings.

Warnings may be ineffective

There are several reasons to doubt the effectiveness of warning labels, even in the absence of advertising. First, risks that are voluntary (Starr, 1969), controllable, familiar, known, or immediate (Slovic, Fischhoff, Lichtenstein, 1980) are more acceptable. The presence of a warning label could hypothetically make the risk more voluntary, controllable, familiar and known, and the acceptable levels of risk for such products would then increase (Lehto & Miller, 1988). Second, product warnings may go unheeded due to the near epidemic rates of product liability cases (Goldhaber and de Turck, 1988) or an overload of warnings (the "crying wolf" phenomenon; Lehto and Miller, 1988: Tversky, Weinstein, Donaher, & Pichler, 1976). Third, the public expects manufacturers and government to protect them. When a government or a manufacturer transfers responsibility for hazard control to

the public (instead of eliminating it), people may underestimate the risk (Ball, 1988). Fourth, people who are risk-seekers, searching out activities in which they experience a loss of control over their environments (Taylor, 1976), may be attracted to activities about which they have been warned (Ferguson, Discenza, & Miller, 1987).

In addition, prior perceptions of products and dangers can affect the reception of a warning. Lehto and Miller (1988) report that if people do not perceive a danger associated with a product, any subsequent warning is less likely to be heeded. Product users, who have different conceptions of the product and risks, are also less likely to perceive risks. Smokers rate cigarette ads with warnings lower on attractiveness and credibility, and they are more resistant to changing their beliefs than are non-smokers (Loken and Howard-Pitney, 1988).

Gender, too, may be a factor in warning effects. A study focusing on the effects of varying the severity of prescription warning labels upon compliance reported an unexpected gender effect: female subjects rated the most severe warning lowest in perceived usefulness while male subjects found the warning increasingly more useful as it became more severe (Ferguson et al. 1987).

Hypotheses

The research problem concerns the effects of advertising and warnings on perceptions of alcohol risks and benefits. We hypothesized that advertisements will increase benefits, and, following the legislative rationale for warnings, that warnings will increase perceived risks. We also expected advertisements to attenuate the effects of the warning label, as advertising's ability to confer benefits upon alcohol products overpowers

a warning's ability to confer risks upon the same products. We further expected to demonstrate the role of alcohol usage in attenuating the risk perceived from alcohol products. The following specific hypotheses were tested:

1. Subjects will perceive an alcohol product in the presence of advertising as more beneficial and of lesser risk compared with subjects evaluating the alcohol product in the absence of advertising (advertising effect).

2. Advertisements will have greater effects for users.

3. Subjects will perceive an alcohol product as less beneficial and of greater risk when it is presented with a warning compared with subjects evaluating the alcohol product without a warning (warning effect).

4. Warnings will have greater effects for non-users than for users.

5. Warning effects will be greater for social risk than for personal risk.

6. Subjects will perceive an alcohol product as more beneficial and of lesser risk when it is presented in the presence of advertising and a warning compared to a warning alone.

7. Advertising will have a distraction effect on warning recall, such that subjects exposed to the warning and advertising will recall the

warning less accurately than subjects exposed to the warning and no advertising.

Method

Subjects were selected from a pool of communication sciences undergraduates at the University of Connecticut and invited to participate in the experiment for course credit. Approximately forty were assigned to each of four experimental conditions (N=159). Half the subjects (equally distributed among the groups) did the experiment in April, 1990; when the initial results proved intriguing, the experiment was rerun in October, 1990, to double the size of each cell.

Procedure

Subjects were told that they would be shown slides of products to evaluate. After completing a consent form, the subjects viewed six slides. The slides showed six different alcohol products in their bottle or can: two beers (Budweiser, Miller Lite), two liqueurs (Rumple Minze peppermint schnapps and Kahlua coffee liqueur), and two spirits (Tanqueray gin and Bacardi rum). The order of presentation was fully rotated by types of products, to control for order effects.

The manipulation consisted of viewing a set of slides with or without a warning and advertisement. In the first condition, the six slides each depicted a bottle of alcohol against a neutral, all white background (n=40). The second condition used slides of the bottles against neutral backgrounds, but the Surgeon General's alcohol warning was displayed at the bottom of each slide, in the visual style of warnings on cigarette ads (n=42). The third condition depicted each bottle in a magazine advertisement (n=40). In

the fourth condition, the warning was added to the bottom of the advertisements (n=37). Care was taken to ensure that the image of the product was the same in all four conditions. Each slide was shown for 15 seconds, after which subjects answered a brief product evaluation questionnaire. Following the slide presentation, all subjects filled out an additional questionnaire on alcohol consumption and risk.

The manipulation check consisted of an item at the end of the final questionnaire asking if they noticed the presence of warnings on the slides. Ninety-five percent of the original subjects correctly answered the manipulation check. The five percent of cases who did not notice the warnings despite being shown them were eliminated from the sample. (Reasons for not noticing the warnings included obstructed vision, and forgetting eye glasses.)

Measures

Confirmatory factor analysis was used to confirm the measurement model. Using the computer program Packet (Hamilton & Hunter, 1988), scales were assessed according to their homogeneity of content, internal consistency, and parallelism with other variables (Hunter, 1980). Items and factor loadings are reported in Table 1.

Table 1 about here

Subjects evaluated the risks and benefits of each product using the same series of 7-point semantic differential items. To control for brands and types of alcohol, the six exciting / unexciting items were added together, and the six fun / not fun items were added together, etc. The

summed items were factor analyzed. The reliability of the alcohol benefits scale was alpha=.89 (mean=165.2; s.d.=29.3; n=159). The alcohol product risk scale was reliable at alpha=.93 (mean=111.9, s.d.=21.7, n=159).

Following the product evaluations, subjects responded to Likert items about risk, including questions about personal and social risk based on Snyder and Rouse (1990) and Neuwirth and Dunwoody (1989). The social risk items loaded together, but the index was not very reliable (alpha=.60; mean=16.35; s.d.=3.14; range=8-21; n=159). Two measures of personal risk did not load together, and therefore were treated as separate items. The first was about the personal risk of general health problems (mean=5.68; s.d.=1.68), and the second was about personal risk from car accidents (mean=5.34; s.d.=1.76). Two items about the subject's perceptions of the amount of risk expressed by the messages formed another scale (alpha=.71; mean=8.65; s.d.=3.54; range=2-14; n=159).

A measure of behavioral intentions incorporated the health aspect of personal risk: "In the future, I will not drink alcohol, or drink it only occasionally, in order to avoid health problems" (mean=4.5, s.d.=1.9, n=159).

At the end of the questionnaire, subjects responded to the manipulation check question, "Did you notice the presence of warnings on the slides?" and were asked, in an open-ended response, to recall what the warning said. The key phrases of the message (Surgeon General, pregnant women, drinking and driving, drinking and operating heavy machinery, and health problems resulting from drinking) were coded for their presence or absence and added together in a recall index (alpha=.76; mean=1.0; s.d.=1.4; range=0-5; n=159).

Subjects also noted their age (mean=18.9, s.d.=1, range 17-22), gender (56.6% women; 43.4% men), and alcohol use ("Do you currently drink alcohol," 84.3% yes; 15.7% no). The few subjects older than 22 were eliminated from the study. In addition, use and gender turned out to be related because there were very few male nondrinkers (one in each cell). This would have caused a multicollinearity problem if both use and gender were entered as independent variables in the same equations. Furthermore, two of the four male nondrinkers had benefits scores that were outliers, making their answers suspect. It was therefore decided to remove the four male nondrinkers from the analysis, and pursue other research targeted specifically at male nondrinkers. Thus, when users are compared to nonusers in the analyses, the comparison is really between male and female drinkers, on the one hand, and female nondrinkers, on the other.

Results

Product benefits and risks

In the first analyses, perceived product risks and benefits were the dependent measures, predicted by the ad and warning experimental conditions, and alcohol use. The first two columns in Table 2 show the full regression models, with ads, warnings, use, and all of their interactions. Because two interaction terms involving use were significant (ads by use, warnings by use), the benefits equation was also specified separately for drinkers and nondrinkers to make the results more understandable. (The equations for drinkers and nondrinkers were derived from the unstandardized coefficients in the full model.)

Hypothesis 1 predicted that exposure to the alcohol ads would cause

subjects to rate the alcohol product benefits higher and risks less, and Hypothesis 2 predicted that the ad effect on ratings would be greater among drinkers. As can be seen from the significance and direction of the advertising coefficients in Table 2, there was a main effect for the ads, such that viewing them caused higher benefit ratings and lower risk ratings. In addition, the ads by use interaction significantly predicted benefit ratings. Contrary to the prediction, however, the ads coefficient for nondrinkers was larger than it was for drinkers. In fact, the pattern is such that the ads caused nondrinkers, who had low benefit ratings in the no ads, no warnings condition, to rate the benefits the nearly the same as drinkers who had not seen the ads. (The ads increased nondrinkers' mean benefit rating from 122.6 to 164.1, and drinkers' mean from 158.8 to 175.2.) Thus, the ads did cause subjects to rate the alcohol products as more beneficial and less risky, with nondrinkers raising their estimates of the benefits more than drinkers.

The next two hypotheses predicted that exposure to the warnings would cause subjects to rate the product benefits as less and the risks greater (Hypothesis 3), and that the warnings would have a greater impact on nondrinkers (Hypothesis 4). The results indicate that the warnings had no effect on ratings of product risk, and the effect on benefits was mixed. Benefit ratings were significantly affected by the interaction between the warnings and use (Table 2, column 2). Nondrinkers show the expected direction of effect -- their estimates of the benefits were lower when they were exposed to the warnings -- but it was not statistically significant. For drinkers, however, the effects were just the opposite. The warnings boomeranged, causing drinkers to rate the alcohol product as <u>more</u>

beneficial.[1]

Personal vs. social risk

Hypothesis 5 predicted that ad and warning effects would be greater for social risk than for personal risk. However, the ad and warning conditions had no effect on either the social alcohol risk index or the two personal alcohol risk items (health problems and car accidents). Both univariate and multivariate analyses were tried.

Do the ads block warning effects?

Hypothesis 6 suggested that viewing the ads and warnings together would attenuate any effect of the warnings to view the product negatively. In our sample, however, the warnings did not cause drinkers to view the alcohol products negatively, and a comparison of drinkers in the ads and warnings condition to drinkers in the warnings condition found no significant difference on their ratings of either product benefits or risks. On the other hand, the same comparison among nondrinkers found that benefits ratings were higher ($t(9)=2.93$, $p=.01$, $eta^2=.49$), and risk perceptions were lower ($t(9)=1.67$, $p=.03$, $eta^2=.24$) in the ads and warnings condition. Note also that the ads coefficient for nondrinkers in Table 2 (column 4) is much larger than the warnings coefficient, indicating that, in the presence of both, ad effects overwhelm warning effects. Thus, Hypothesis 6 held for nondrinkers, such that the ads diminished the warning effect among nondrinkers, causing them to view the alcohol product more favorably. There was also a slight indication that presenting the ads with the warnings caused lower perceptions of personal risk from accidents among female drinkers ($t(34)=1.5$, $p=.04$, $eta^2=.06$), but the relationship was barely significant.

Hypothesis 7 predicted that subjects in the ads and warnings condition would remember less about the warning than subjects in the warning condition. It was based on the proposition that the ads were a distraction, blocking complete and accurate recall of warnings. The difference in the recall levels between subjects in the warnings condition and subjects in the warnings and ads condition was not quite significant in the total population ($\underline{t}(75)=1.6$, $\underline{p}=.06$, $eta^2=.03$). It was barely significant among women ($\underline{t}(45)=1.8$, $\underline{p}=.04$, $eta^2=.05$), such that their recall of the warning was slightly less if they viewed the ads.

Perceptions of safe drinking expressed by the messages

We were interested to see what overall messages concerning the safety of drinking alcohol were conveyed by the ads and the warnings. If the subjects in the four conditions perceived the messages as communicating the same amount of safety, then we could trace the differences in product evaluations to what happened after the information was received. If the subjects perceived the messages as expressing different amounts of safety, then we would know that at least part of the reason for product evaluation differences was due to the way the messages were understood.

Predictably, subjects in the advertising conditions interpreted the messages as saying that alcohol drinking is safer ($\underline{beta}=-.57$, $\underline{t}(154)=-8.5$, $p<.001$), but there was no effect of the warnings. Nondrinkers were more likely to interpret the advertising message as safer than were drinkers -- adding the ads by use interaction term to a main effect model increased the R^2 significantly ($\underline{R^2 delta}=.02$, $\underline{F}(1,154)=4.4$, $\underline{p}=.04$, beta=.38, t(154)=2.1, p=.04). In turn, perceiving more safety assurances in the messages was related to judging the products as having less risk ($r=.27$, $p<.001$) and

greater benefits ($r=.29$, $p<.001$). Subjects did not see the warnings as conveying a message that alcohol drinking is an unsafe activity for themselves or others.

Drinking intentions

Although we had not hypothesized about behavioral intentions, we looked at the subjects' intentions to drink in the future despite potential health risks. Viewing the ads caused nondrinkers to have lower drinking intentions ($F(1,17)=4.5$, $p=.05$, $eta^2=.21$). Consistent with the warning boomerang on product benefit perceptions, the warnings caused male drinkers to have greater drinking intentions ($F(1,61)=4.99$, $p=.03$, $eta^2=.07$).

Summary

Overall, our hypotheses concerning advertising effects were demonstrated. The advertisements endowed alcohol products with more benefits and diminished their risks. The effect was even greater among non-drinkers.

Our hypotheses concerning warning effects were not supported. Indeed, not only did the warnings fail to raise concerns over alcohol risks, but for drinkers they served to make alcohol even more attractive. For nondrinkers, the advertisements attenuated the warning effect, causing them to view alcohol more favorably. There was some indication that warnings in the presence of advertising caused women drinkers to lower their assessments of personal risk from drunk-driving accidents. The advertisements also interfered slightly with women's ability to recall the warnings, substantiating the hypothesized distraction effect.

Subjects interpreted the overall advertising message to be that drinking alcohol is a safe activity. This connotation affected both

drinkers and nondrinkers, and is part of the reason why viewing the ads caused subjects to rate alcohol products as more beneficial and less risky. Revealingly, the warnings were not perceived as communicating greater dangers of alcohol drinking.

Conclusions

Perhaps the most important finding in the experiment was that the Surgeon General's alcohol warning boomeranged among those it needed to reach the most -- the large group of drinkers. Contrary to the legislative intent of the warnings, the young drinkers in the experiment actually had higher ratings of the benefits of alcohol products when they saw the warnings. Male drinkers exposed to the warnings also expressed greater drinking intentions than their peers who did not see the warnings. The results are consistent with an anti-drug public service announcement study among high school students in the 1970s that found a boomerang effect of the PSAs over time (Feingold & Knapp, 1977). The warning boomerang may be a function of teen rebellion. It may also be that, by specifying dangers remote to this age group, the warnings have the effect of allaying more pertinent fears.

Several studies support the fact that young adults are a particularly difficult population to change through anti-drinking messages. Drinking and driving fatalities dropped among teens in the 1980s (Fell and Nash, 1989), but self-reported drinking and driving behavior is still highest among men and young adults (Smith, Remington, & Behavioral Risk Factor Surveillance Group, 1989). For college students, car accidents are probably the most pertinent risk of those in the Surgeon General's alcohol warning, but perceived personal risk of car accidents failed to relate to warning

exposure in our study. Unlike the successful interventions of raising the minimum legal drinking age to 21, increasing alcohol taxes, and better enforcement of drinking-driving laws (Moskowitz, 1989), alcohol warning labels in their present form may not positively alter drinking and driving patterns.

In addition, a study of pregnant women (Serdula, Williamson, Kendrick, Anda, & Byers, 1991) revealed an overall drop in drinking except among women ages 18 to 24, those with less education, and smokers. The comparison dates (1985 to 1988) predate alcohol warning labels, but do indicate that other health education steps have been ineffective with young women.

We were particularly interested in looking at alcohol warnings because they currently exist in a climate of relatively unrestricted alcohol advertising -- the major restriction in the U.S. being a prohibition on broadcasting liquor ads. Contrary to the self-regulation of some alcohol industry groups, and whether advertisers intend so or not, the advertisements tested were indeed appealing to persons under the legal age. The alcoholic beverage ads in our study promoted drinking, making college students rate the alcohol products as more beneficial and less risky.

Furthermore, our study provides evidence that alcohol advertising can be quite powerful even with health warnings at the bottom of an ad. The ads effectively negated the weak warning effects among nondrinkers, leaving them with positive attitudes towards the alcoholic beverages. In addition, with the alcohol warning boomeranging among drinkers, the industry has little need for ads to counter the warnings among that population. Given these results, the alcohol industry, like the cigarette industry, will undoubtedly survive any mandate to put warnings on advertisements. Our results do

support health advocates who wish to ban alcohol advertising altogether.

It appears that ads alter the way people perceived and processed the pictures of alcohol. For everyone, but especially nondrinkers, the ads communicated that drinking is safe. There was also weak evidence that ads act as a distraction, hindering the cognitive processing of warning messages. (The weak findings could be due to little variance on recall, which was measured after subjects had completed the questionnaire and perhaps been cued to remember more than they would have otherwise.)

The nondrinkers in the sample, all women, reacted to the advertisements in an interesting way. They were attracted by the ads, rating the products as more beneficial and reading more safety in the messages than those who did not see the ads. At the same time, they grew more determined not to drink in the future after exposure to the ads. Future research could investigate how nondrinkers maintain their commitment in the face of seemingly positive ratings of alcohol products.

Although there was no evidence supporting an impersonal impact of the warnings on social risk, the measures of personal and social risk judgments were not very reliable. While it is unclear whether people evaluated products at the personal or social level, the warnings did not affect the more reliably measured product risk perceptions. Since they did impact on product benefit perceptions, in addition to improving measures of personal and social risk to better test the impersonal impact hypothesis, researchers could create measures to explicitly tap perceptions of personal and social benefits.

The suggestion to explore personal and social benefits is compatible with recent arguments concerning the relative importance of benefits over

risks when attempting to influence health behaviors (Leathar & Hastings, 1987). There may be a role for both positive and negative appeals in health communications (Robberson & Rogers, 1988). The fact that, in our study, product benefits were more susceptible to influence suggests that targeting benefits may indeed prove a more promising strategy with young people than targeting risks, as the current warning labels do.

We do not mean to imply that alcohol warnings should be ceased; rather, given that our limited laboratory evidence suggests current alcohol warnings are at best ineffective and potentially counterproductive with some audiences, more research should be conducted to create warnings that would be meaningful and appropriate for young adults. Such research should explore which alcohol risks are particularly meaningful for young adults, counterarguing strategies to use against advertisements, and effective means to communicate both warnings and ad counterarguing strategies. It is important to replicate our initial study with other ages and education groups, and using more naturalistic methodologies. Consistent with our experimental findings, initial results of field surveys suggest that, although there has been an increase in awareness of the warnings since their introduction, knowledge and social risk perceptions have not changed (Mayer, Smith, & Scammon, 1991).

Lastly, while the number of government-mandated warnings proliferates, our study suggests that consumers' reactions to product warnings are not yet understood. We seem to know very little about the conditions under which public warnings are an effective way to communicate, or the best form for those warnings. Warnings may be appropriate in the short term only for older groups. As suggested, perhaps our warning boomerang can be explained

by teen rebellion and perceived invincibility. Or warnings may have a generational effect, as might be the case with drug education in the 1980s, socializing new generations before they start the behavior, but not changing attitudes of those already set in their ways. However, there is no evidence of a generational effect with cigarette warning labels, which do not seem to have deterred new generations of young women from starting to smoke. Or warnings may enhance the social acceptability of reasons to not undertake the behavior, such as not drinking because one needs to drive afterwards. Finally, the benefit of public warnings may be to force the marketplace to provide more alternative products with decreased risk, such as "natural" insecticides, low-nicotine cigarettes, non-alcoholic beers, and low-alcohol drinks. The presence of alternative products may communicate more effectively about potential risks than warnings.

Table 1

Measurement model

Items	Factor Loadings
Alcohol product benefits	
Attractive product/not attractive product	.82
Fashionable/not fashionable	.78
Pleasant tasting/not pleasant tasting	.63
Exciting/unexciting	.82
Fun/not fun	.75
Sexy/unsexy product	.81
Alcohol product risk	
Product a serious health risk/not a health risk	.82
Harmful/beneficial product	.91
Safe/unsafe product	.94
Risky/not risky product	.82
Risk suggested by the stimulus materials	
The slides suggest that drinking alcohol would be a safe activity for me.	.87
The slides suggest that everyone can safely enjoy drinking alcohol.	.87
Social risk	
I don't think that alcohol-related health problems are that wide-spread in Connecticut.	.64
Connecticut residents face a serious threat from a high incidence of drunk-driving accidents.	.55
Drinking alcohol involves a lower risk for most people than the media would suggest.	.54

Table 2

Effects of the ads, warnings, and alcohol use on perceptions of product benefits and risks

	Product Risks	Product benefits		
		Total	Drinkers	Nondrinkers
Use	-.35***	.36***		
Ads	-.25*	.48***	.25**	.67**
Warnings	-.06	.03	.32***	-.21
Ads*Warnings	-.08	-.06	-.14	.01
Ads*Use	.07	-.26*		
Warnings*Use	.02	.26*		
Ads*Warnings*Use	.16	-.07		
R^2	.17***	.33***	.42***	.40*

N=155. Table entries are estimated standardized regression coefficients.

* p<.05, ** p<.01, *** p<.001

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Footnotes

1. Checking to see if the warning boomerang could have been caused by outliers, we found that, in the total sample, there were no cases greater than two standard deviations above the mean in any of the conditions. The six cases further than two standard deviations below the mean were from the no ads, no warnings condition (4 cases), and warnings condition (2 cases). Thus, the relatively high mean in the warnings condition was not due to outliers.